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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/771,275	01/26/2001	Konstantinos I. Papathomas	EN995064BVUS4	7979

5409 7590 09/05/2003

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EXAMINER

BERMAN, SUSAN W

ART UNIT PAPER NUMBER

1711

DATE MAILED: 09/05/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/771,275

Applicant(s)

PAPATHOMAS ET AL.

Examiner

Susan W Berman

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 24 June 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 13-19,21-24 and 27-31 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 13-19,21-24,27-31 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____
- 4) ☐ Interview Summary (PTO-413) Paper No(s) _____
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____

Response to Amendment

The disclosure has been amended to correct the recited weight percents of filler relative to binder and to replace "Arocy...F-10" with "Arocy L-10". The objection to the specification is withdrawn.

Response to Arguments

Applicant's arguments filed 06-25-2003 have been fully considered but they are not persuasive.

With respect to the obviousness-type double patenting rejection of record, applicant argues that the obviousness-type double patenting rejection has been confused with an obviousness rejection using 35 USC 102(e) prior art. Applicant argues that the examiner bases the rejection upon the disclosure rather than upon the claims of US '955. This argument is not persuasive with respect to the obviousness-type double patenting rejection because the obviousness-type double patenting rejection set forth relied upon comparison of the claims of US 6,129,955 with the instant claims. The disclosure of a secondary reference, i.e. Christie et al, is properly relied upon for teaching that cyanate esters can be employed instead of epoxy resins in analogous compositions and methods. However, the reasons for the rejection have been rewritten in response to the "consisting essentially of" claim language in previously amended claim 13.

With respect to the rejections under 35 USC 112, first paragraph, applicant's arguments are unpersuasive for the following reasons. Applicant argues that the word "filler" in the cited paragraph on page 25 means (or refers to) silica. This paragraph is cited for disclosing that the dispersed silica filler must be of the disclosed particle size. The paragraphs on page 4 state that the compositions of the disclosed invention comprise a dispersed phase of particulate silica. With respect to the word "filler" in the instant claims, applicant's arguments are unpersuasive because the word "filler" is universally recognized as including numerous kinds of materials that provide the function of a filler and does not require the presence of a dispersed phase of particulate silica as required in applicant's disclosed

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invention. Applicant discloses several different fillers (not including silica) that are thermally conductive and electrically insulating fillers for improving thermal heat transfer as being suitably used in the instantly disclosed compositions and method on page 24, lines 24-28. The examiner understands that the 31 micron size is disclosed as being the size of silica filler to be used in the instantly claimed method. The issue is that the disclosed compositions contain dispersed silica filler having a particle size of 31 microns or less and optionally contain a second thermally conductive and electrically insulating filler selected from the group set forth on page 24, lines 24-28. See page 4, lines 9-12 and lines 23-25, page 25, lines 4-10. The rejection is maintained because the claims do not specify that the required filler is a dispersed phase of silica having the particle size specified. See original claims 13, 19, 20 and 24, filed 01-26-2001.

Applicant's argument with respect to onium salt photoinitiators are persuasive on the basis that applicant discloses organometallic onium salt photoinitiators suitable for photocuring cyanate esters.

Upon reconsideration, the rejections of claims under 35 USC 103(a) over Christie et al are withdrawn in response to applicant's arguments for reconsideration. It is agreed that Gaku et al and McCormick et al specifically teach photoinitiators for free radical polymerization of ethylenically unsaturated monomers. Since free radically polymerizable ethylenically unsaturated monomers are excluded from use in the instantly claimed method, it would not have been obvious to employ the photoinitiators taught by these references in the instantly claimed method. See Gaku et al column 1, lines 58-64 and, in McCormick et al, the Abstract.

New grounds of rejection are set forth herein below.

Claim Rejections - 35 USC § 112

The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

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Claims 13-18, 21-24 and 27-29 are rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure that is not enabling. A composition containing a dispersed phase of particulate silica is critical or essential to the practice of the invention, but not included in the claim(s); therefore, the claims are not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976). See page 4, lines 9-12 and lines 23-25, page 25, lines 4-10, Example 4 and original claims 13, 19 and 20, filed 01-26-2001. Optional fillers that are thermally conductive and electrically insulating are disclosed on page 24, lines 24-28.

Claims 13-24 and 27-29 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a method wherein the composition comprises a cyanate ester, a photoinitiator and a dispersed phase of particulate silica and, optionally, thermally conductive and electrically insulating filler (Alumina, etc., as disclosed on page 24, lines 24-28), does not reasonably provide enablement a method wherein the composition comprises a cyanate ester, a photoinitiator and any known "filler". The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to practice the invention commensurate in scope with these claims. See page 4, lines 9-12 and lines 23-25, page 19, lines 8-12, page 25, lines 4-10, Example 4 and original claims 13, 19, 20 and 24. The required filler disclosed is dispersed silica. Fillers (other than dispersed silica) that are thermally conductive and electrically insulating are disclosed as being added to the dispersed filler on page 24, lines 24-28.

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 24 and 27 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the

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invention. Claim 24: it is not clear what is intended by "further comprises a filler...". The claim language in claims 13 and 24 fails to distinguish between the filler in claim 13 and the "further... filler" in claim 24. What kind of filler recited in claim 13 is the "further... filler" recited in claim 24 being added to? Claim 27 improperly depends on claim 1 since claim 1 has been canceled.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 13-19, 21-24 and 27-31 are rejected under 35 U.S.C. 102(e) as being anticipated by or, alternatively, under 35 U.S.C. 103(a) as being unpatentable over Papathomas et al (6,129,955). Papathomas et al disclose a method for encapsulating a solder joint with a photocured epoxy resin or cyanate ester resin, such as the cyanate esters disclosed in columns 11-12, a silica filler and a photoinitiator. See column 11, lines 10-22. The instantly claimed method is anticipated by the disclosure of Papathomas et al wherein a cyanate ester is employed as the resin in the composition. Alternatively, It would have been obvious to one skilled in the art at the time of the invention to select a method employing a cyanate ester composition because Papathomas et al teach that either an epoxy resin or a cyanate ester resin can be employed.

Claims 13-19, 21-24 and 27-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Christie et al (5,250,848) in view of Papathomas et al (6,129,955). Christie et al disclose a method for encapsulating C4 connections and pin heads (column 7, lines 1-16). Solder interconnections are filled

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with a composition comprising a cycloaliphatic polyepoxide and/or a curable cyanate ester and a filler having a maximum particle size of 31 microns and cured by heating. Christie et al do not teach employing a photoinitiator, such as an organometallic complex salt or onium salt, and photocuring in the disclosed method. Papathomas et al disclose a method for encapsulating a solder joint with a photocured epoxy resin or cyanate ester resin, such as the cyanate esters disclosed in columns 11-12, a silica filler and a cationic photoinitiator.

It would have been obvious to one skilled in the art to select a cyanate ester composition for use in the method for encapsulating solder connections disclosed by Christie et al because Christie et al teach using a composition comprising a polyepoxide or a cyanate ester. It would have been obvious to one skilled in the art at the time of the invention to substitute a photoinitiator and photocuring for the thermal catalyst and thermal curing in the method for curing a cyanate ester composition taught by Christie et al, as taught by Papathomas et al in analogous methods using analogous compositions. One skilled in the art would have been motivated by a reasonable expectation of successfully encapsulating a solder joint and obviating thermal stress problems by employing radiation curing, as taught by Papathomas et al (column 2).

Claims 13-16, 18, 19, 21-24 and 27-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Christie et al (5,250,848) in view of McCormick et al (5,215,860). Christie et al disclose a method for encapsulating C4 connections and pin heads (column 7, lines 1-16). Solder interconnections are filled with a composition comprising a cycloaliphatic polyepoxide and/or a curable cyanate ester and a filler having a maximum particle size of 31 microns and cured by heating. Christie et al do not teach employing a photoinitiator, such as an organometallic complex salt or onium salt, and photocuring in the disclosed method. McCormick et al disclose a method for thermal or radiation polymerization of cyanate monomers

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by adding an organometallic catalyst that releases a Lewis acid upon irradiation. See column 2, line 41, to column 3, line 14, column 7, lines 35-52, column 10, lines 42-66, and column 11, lines 20-31.

It would have been obvious to one skilled in the art to select a cyanate ester composition for use in the method for encapsulating solder connections disclosed by Christie et al because Christie et al teach using a composition comprising a polyepoxide or a cyanate ester. It would have been obvious to one skilled in the art at the time of the invention to substitute an organometallic catalyst and radiation polymerization for the thermal catalyst and thermal curing in the method for curing a cyanate ester composition taught by Christie et al, as taught by McCormick et al in an analogous method using analogous cyanate monomer compositions. One skilled in the art would have been motivated by an expectation of obtaining the advantages of using organometallic catalysts and radiation curing at lower temperatures and faster rates as taught by McCormick et al in columns 2-3.

Claims 13-16, 18, 19, 21-24 and 27-30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Christie et al (5,250,848) in view of Pujol et al (5,143,785). Christie et al disclose a method for encapsulating C4 connections and pin heads (column 7, lines 1-16). Solder interconnections are filled with a composition comprising a cycloaliphatic polyepoxide and/or a curable cyanate ester and a filler having a maximum particle size of 31 microns and cured by heating. Christie et al do not teach employing a photoinitiator, such as an organometallic complex salt or onium salt, and photocuring in the disclosed method. Pujol et al disclose adhesive composition for bonding electronic components comprising cyanate monomers and photochemically activated organometallic catalysts. See the Abstract, column 6, line 60, to column 7, line 23, and the examples.

It would have been obvious to one skilled in the art to select a cyanate ester composition for use in the method for encapsulating solder connections disclosed by Christie et al because Christie et al teach using a composition comprising a polyepoxide or a cyanate ester. It would have been obvious to one

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skilled in the art at the time of the invention to substitute an organometallic catalyst and radiation polymerization for the thermal catalyst and thermal curing in the method for curing a cyanate ester composition taught by Christie et al, as taught by Pujol et al in an analogous method using analogous cyanate monomer compositions. One skilled in the art would have been motivated by an expectation of obtaining the advantages of using organometallic catalysts, such as increased shelf life an adhesive film that cures to a hard, tough material, as taught by Pujol et al in column 2, lines 42-55, column 4, line 26-34, column 7, lines 2-3.

Double Patenting

Claims 13-19, 21-24 and 27-31 are rejected under obviousness-type double patenting as being unpatentable over claims 1-9 of US 6,129,955 in view of Christie et al. Papathomas et al '955 claims a method for encapsulating a solder joint with a photocured composition comprising an epoxy resin, a silica filler and a photoinitiator. Christie et al teach, in analogous art, that compositions comprising a cycloaliphatic polyepoxide and/or cyanate ester or prepolymer thereof are useful for providing a solder interconnection. Thus, it would have been obvious to one skilled in the art to substitute a cyanate ester compound for the polyepoxide in the compositions recited for use in the method claimed in US '955 because Christie et al teach that polyepoxide or cyanate esters provide useful compositions for solder interconnection methods.

The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

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Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).


Conclusion

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US 5,194,930 and US 5,471,096, each to Papathomas et al, are considered to be equivalent to Christie et al in the rejections set forth above. Hedrick et al (5,919,596) disclose a photosensitive polycyanurate resist wherein the compositions comprise organometallic compounds, sulfonium salts, or iron arenes.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Susan Berman whose telephone number is (703) 308-0040.

The fax number for this group is (703) 872-9310 or, for submissions after Final Rejection, (703) 872-9311.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group Receptionist at telephone number (703) 308-0661.



Susan Berman
Primary Examiner
Art Unit 1711

S B
August 30, 2003